Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Hip and groin disorders.

Bibliographic Source(s)

Hip and groin disorders. In: Hegmann KT, editor(s). Occupational medicine practice guidelines. Evaluation and management of common health problems and functional recovery in workers. 3rd ed. Elk Grove Village (IL): American College of Occupational and Environmental Medicine; 2011. p. 1-440. [1499 references]

Guideline Status

This is the current release of the guideline.

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- March 22, 2016 – Opioid pain medicines : The U.S. Food and Drug Administration (FDA) is warning about several safety issues with the entire class of opioid pain medicines. These safety risks are potentially harmful interactions with numerous other medications, problems with the adrenal glands, and decreased sex hormone levels. They are requiring changes to the labels of all opioid drugs to warn about these risks.

Recommendations

Major Recommendations

Definitions for the strength of evidence ratings (A, B, C, and I) and the criteria for evidence-based recommendations are presented at the end of the "Major Recommendations" field.

Summary Tables: Recommendations and Evidence

Table 1 summarizes the recommendations from the Evidence-based Practice Hip Panel for diagnostic testing for hip and groin disorders. Table 2 is

a summary of recommendations for managing these disorders. Table 3 is a summary of pre-, peri-, and post-operative rehabilitation recommendations related to these disorders. Recommendations are based on critically appraised higher quality research evidence, and on expert consensus, observing First Principles when higher quality evidence was unavailable or inconsistent. The reader is cautioned to utilize the more detailed indications, specific appropriate diagnoses, temporal sequencing, prior testing or treatment, and contraindications that are elaborated in more detail for each test or treatment in the body of this Guideline in using these recommendations in clinical practice or medical management. These recommendations are not simple "yes/no" criteria, and the evidence supporting them is in nearly all circumstances developed from typical patients, not unusual situations or exceptions.

Recommendations are made under the following categories:

- Strongly Recommended, "A" Level
- Moderately Recommended, "B" Level
- Recommended, "C" Level
- Insufficient-Recommended (Consensus-based), "I" Level
- Insufficient-No Recommendation (Consensus-based), "I" Level
- Insufficient-Not Recommended (Consensus-based), "I" Level
- Not Recommended, "C" Level
- Moderately Not Recommended, "B" Level
- Strongly Not Recommended, "A" Level

Table 1. Summary of Recommendations for Diagnostic and Other Testing for Hip and Groin Disorders

Test	Recommendation(s)
Antibodies	Antibody levels to evaluate and diagnose patients with hip pain if there is reasonable suspicion of a rheumatological disorder – Recommended, Insufficient Evidence (I) Antibody levels as a screen to confirm the existence of specific disorders (i.e., rheumatoid arthritis) – Strongly Recommended, Evidence (A)
Hip Arthroscopy	Arthroscopy to evaluate and diagnose patients with hip pain if there is a suspicion of labral tear, intraarticular body, femoroacetabular impingement, or there are other subacute or chronic mechanical symptoms – Recommended, Insufficient Evidence (I) Arthroscopy for diagnosing acute hip pain – Not Recommended, Insufficient Evidence (I) Arthroscopy to diagnose or treat acute, subacute, or chronic hip osteoarthrosis in the absence of a remediable mechanical defect such as symptomatic labral tear – Not Recommended, Insufficient Evidence (I) Arthroscopy with chondroplasty for treatment of osteoarthrosis – Not Recommended, Insufficient Evidence (I)
Bone Scans	Bone scanning for select use in patients with acute, subacute or chronic pain to assist in the diagnosis of osteonecrosis, neoplasms, or other conditions with increased polyostotic bone metabolism, particularly when more than one joint needs to be evaluated – Recommended, Insufficient Evidence (I) Bone scanning for routine use in hip joint evaluations – Not Recommended, Insufficient Evidence (I)
Computerized Tomography (CT)	Routine CT for evaluating acute, subacute, or chronic hip pain – Not Recommended, Insufficient Evidence (I) CT for evaluating patients with osteonecrosis or following traumatic dislocations or arthroplasty-associated recurrent dislocations – Recommended, Insufficient Evidence (I) CT for patients who need advanced imaging, but have contraindications for MRI – Recommended, Insufficient Evidence (I) Routine helical CT for evaluating acute, subacute, or chronic hip pain – Not Recommended, Insufficient Evidence (I)

Test	Recommendation(s)
	Helical CT for evaluating patients with osteonecrosis who have contraindications for MRI – Recommended, Insufficient Evidence (I) Helical CT for select patients with acute, subacute or chronic hip pain for whom advanced imaging of bony structures is thought to be potentially helpful – Recommended, Insufficient Evidence (I) Helical CT for patients who need advanced imaging, but have contraindications for MRI – Recommended, Insufficient Evidence (I)
C-Reactive Protein, Erythrocyte Sedimentation Rate, and Other Nonspecific Inflammatory Markers	Erythrocyte sedimentation rate or other inflammatory markers for screening for inflammatory disorders or prosthetic sepsis with reasonable suspicion of inflammatory disorder in patients with subacute or chronic hip pain – Recommended, Insufficient Evidence (I)
Local Anesthetic Injections and Epidurals	Local anesthetic injections to assist in the diagnosis of subacute or chronic hip pain – Recommended, Insufficient Evidence (I)
Electromyography (including Nerve Conduction Studies)	Electrodiagnostic studies to assist in the diagnosis of subacute or chronic peripheral nerve entrapments including lateral cutaneous nerve to the thigh (meralgia paresthetica) – Recommended, Insufficient Evidence (I) Nerve conduction study to confirm diagnosis or in patients for whom surgery is contemplated – Recommended, Insufficient Evidence (I)
Magnetic Resonance Imaging (MRI)	MRI for select patients with subacute or chronic patients with consideration of accompanying soft tissue pathology or other diagnostic concerns – Recommended, Insufficient Evidence (I) MRI for diagnosing osteonecrosis – Recommended, Insufficient Evidence (I) MRI for routine evaluation of acute, subacute, or chronic hip joint pathology, including degenerative joint disease – Not Recommended, Insufficient Evidence (I) MRI to diagnose hamstring or hip flexor strains in more severe cases – Recommended, Insufficient Evidence (I) MRI to diagnose groin strains or adductor-related groin pain in more severe cases – Recommended, Insufficient Evidence (I)
MR Arthrogram	MR arthrogram to diagnose femoroacetabular impingement, labral tears, gluteus medius tendinosis or tears, or trochanteric bursitis in patients with subacute or chronic hip pain – Recommended, Insufficient Evidence (I)
Roentgenograms (X-rays)	X-rays for evaluating acute, subacute or chronic hip pain or femoroacetabular impingement or dysplasia – Recommended, Insufficient Evidence (I) X-rays for diagnosing osteonecrosis – Recommended, Insufficient Evidence (I) X-rays to diagnose hamstring or hip flexor strains in more severe cases – Recommended, Insufficient Evidence (I) X-rays to diagnose groin strains or adductor-related groin pain in more severe cases – Recommended, Insufficient Evidence (I)
Single Proton Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET)	SPECT or PET for diagnosing acute, subacute or chronic hip pain – Not Recommended, Insufficient Evidence (I)
Ultrasound	Ultrasound for evaluating patients with gluteus medius tendinopathies, greater trochanteric bursitis, greater

Test	Recommendation(s)
	trochanteric pain syndrome/lateral hip pain, groin strains, femoroacetabular impingement, hip instability, dislocation, ligamentum teres ruptures, labral tears, or post-arthroplasty chronic pain where peri-articular masses are suspected – Recommended, Insufficient Evidence (I) Ultrasound to diagnose other hip disorders including osteonecrosis, osteoarthritis, dysplasia, or fractures – No Recommendation, Insufficient Evidence (I)
Urine Culture	Culturing urine to diagnose lower abdominal strain unless other symptoms are present – No Recommendation, Insufficient Evidence (I) Urine cultures for select patients to diagnose epididymitis or epididymo-orchitis – Recommended, Insufficient Evidence (I)

Table 2. Summary of Recommendations for Managing Hip and Groin Disorders

Hip and Groin Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
Acute, Subacute, or Chronic Hip and Groin Pain	Measures to prevent falls (I) Activities that do not substantially aggravate symptoms for most patients with acute, subacute, or chronic hip or groin pain (I) Bed rest for patients with clear contraindication to weight-bearing status such as an unstable fracture (I) Non-steroidal anti-inflammatory drugs (NSAIDs) for chronic hip pain especially if due to osteoarthrosis (A) NSAIDs for acute or subacute hip pain (I) NSAIDs for acute flares (C) Proton pump inhibitors or misoprostol for patients at substantially increased risk for gastrointestinal bleeding (A) Sucralfate for patients at substantially increased risk for gastrointestinal bleeding (B) H2 blockers for patients at substantially increased risk for gastrointestinal bleeding (C) NSAIDs for patients with known cardiovascular disease or multiple risk factors for cardiovascular disease if the risks and benefits of NSAID therapy for pain are discussed (I) Acetaminophen (or the analog, paracetamol) for acute or subacute hip pain particularly in patients who have contraindications for NSAIDs (I)	Ergonomic interventions to prevent or facilitate recovery (I) Yoga for chronic persistent hip pain (I) Norepinephrine reuptake inhibiting anti-depressants for subacute or chronic hip pain (I) Topiramate for subacute or chronic hip pain (I) Gabapentin for subacute or chronic hip pain (I) Willow bark (Salix), ginger extract, rose hips, Camphora molmol, Maleluca alternifolia, Angelica sinensis, Aloe vera, Thymus officinalis, Mentha piperita, Arnica montana, Tancaetum parthenium, and zingiber officinalis, avocado soybean unsaponifiables, oral enzymes, topical copper salicylate, S-Adenosylmethionine, and diacerein harpagoside for acute, subacute, or chronic hip pain (I) Acupuncture for acute or subacute hip pain (I) Diathermy for acute, subacute, or chronic hip pain (I) Infrared therapy for acute, subacute, or chronic hip pain (I) Ultrasound for acute, subacute, or chronic hip pain (I) Low-level laser therapy for acute, subacute,	Bed rest for patients with acute, subacute, or chronic hip pain (I) Norepinephrine reuptake inhibiting anti-depressants for acute hip pain (I) Selective serotonin reuptake inhibitors (SSRIs) for acute, subacute, or chronic hip pain (I) Skeletal muscle relaxants (I) Topiramate (I) Gabapentin for acute hip pain (I) Routine use of opioids for acute, subacute, or chronic non-malignant pain conditions (C) Topical NSAIDs (I) Wheatgrass cream (I) Lidocaine patches (I) Eutectic mixture of

Hip and Groin Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Other
	Acetaminophen (or the analog, paracetamol) for chronic hip pain particularly in patients who have contraindications for NSAIDs (C) Acetaminophen or aspirin as a 1st-line therapy for patients with cardiovascular disease risk factors (A) Judicious use of opioids for acute severe hip pain (I) Opioids for select patients with subacute or chronic hip pain (I) Muscle relaxants for acute and subacute, moderate to severe hip pain from muscle spasm that is unrelieved by NSAIDs, avoidance of exacerbating exposures or other conservative measures (I) Capsicum for short-term treatment of acute or subacute hip pain as well as for acute exacerbations of chronic hip pain as a counter-irritant (I) Canes and crutches for moderate to severe acute hip or groin pain or subacute and chronic hip or groin pain where the device is used to advance the activity level (I) Orthotics, shoe insoles, or shoe lifts for patients with significant leg length discrepancy with hip pain felt to be a consequence of that discrepancy (I) Cryotherapies for home use if efficacious for temporary relief of acute, subacute, or chronic hip pain (I) Self-application of low-tech heat therapy for acute, subacute, or chronic hip pain (I) Manipulation or mobilization for subacute or chronic hip pain (C) A psychological evaluation as part of the evaluation and management of patients with chronic hip pain (see indications) in order to assess whether psychological factors will need to be considered and treated as part of the overall treatment plan (I) Cognitive-behavioral therapy as an adjunct to an interdisciplinary program for subacute or chronic hip pain (I) Work conditioning, work hardening, and early intervention programs for chronic hip pain syndromes (I)	or chronic hip pain (I) Manipulation or mobilization for acute hip pain (I) Massage for acute, subacute, or chronic hip pain (I) Electrical therapies outside of research settings for acute, subacute, or chronic hip pain (I) Transcutaneous electrical nerve stimulation (TENS) for acute, subacute, or chronic hip pain (I) Botulinum injections (I) Biofeedback for chronic hip pain (I)	local anesthetics (EMLA) (I) Not Recommended creams/ointments (I) Tumor necrosis factor-alpha blockers for acute, subacute, or chronic hip pain (I) Complementary or alternative treatments or dietary supplements, etc. for acute, subacute, or chronic hip pain (I) Magnets and magnetic stimulation for acute, subacute, or chronic hip pain (I) Reflexology for acute, subacute, or chronic hip pain (I) Prolotherapy injections for acute, subacute, or chronic hip pain (I)

Hip and Groin Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
	Multidisciplinary or interdisciplinary program (IPRP) with a focus on behavioral or cognitive-behavioral approaches combined with conditioning exercise for patients who due to chronic hip pain, demonstrate partial/total work incapacity (I)		
Osteonecrosis	Measures to prevent falls (I) Reduction or elimination of activities that significantly provoke osteonecrotic symptoms, including avoidance of dysbaric exposures, or control of diabetes mellitus, elimination or reductions in glucocorticosteroid use, and/or elimination of alcohol and tobacco products (I) Aggressive targeting of all coronary artery disease risk factors (I) Bisphosphonates particularly for mild to moderate cases of osteonecrosis (C) NSAIDs (I) Core decompression surgery (I) Hip arthroplasty for osteonecrosis with collapse or unresponsive to nonoperative treatment (A) Total hip arthroplasty as an effective operation to speed improvements in patient's symptoms and functional status in those with moderate to severe hip disease (A) Metal-on-metal hip resurfacing arthroplasty for select patients (C)	Ergonomic interventions to prevent or facilitate recovery (I) Institution of non-weight-bearing activities (I) Hyperbaric oxygen (I)	Glucocorticosteroids, including by injection, in early disease stages (I)
Bilateral Osteoarthrosis or Hip Joint Disease	Measures to prevent falls (I) For bilateral disease, carefully selected patients may safely undergo simultaneous bilateral hip replacement (C) Total hip arthroplasty as an effective operation to speed improvements in patient's symptoms and functional status in those with moderate to severe hip disease (A) Metal-on-metal hip resurfacing arthroplasty for select patients (C)	Ergonomic interventions to prevent or facilitate recovery (I) Botulinum injections (I)	
Epididymo-Orchitis	Measures to prevent falls (I) NSAIDs (I)	Ergonomic interventions to prevent or facilitate recovery (I)	Bed rest (I)

Hip and Groin Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	Not Recommended	Not Recommended
	Age-appropriate antibiotics (I) Physical or occupational therapy (I)	Needle aspiration for epididymito-orchitis (I) Work limitations for patients with epididymitis or epididymo-orchitis, although limitations may be necessary depending on the severity of the condition and the physical job demands (I) Ice (I) Intermittent elevation (I)	
Gluteus Medius Tendinosis and Tears	Measures to prevent falls (I) Trochanteric glucocorticosteroid injections for gluteus medius tears with accompanying clinical bursitis (C) NSAIDs or acetaminophen for gluteus medius tears with accompanying clinical bursitis (I) Progressive, eccentric exercise for gluteus medius tendinosis and tears, particularly to strengthen the lateral hip musculature (I) Surgical repair for gluteus medius tears that are non-responsive to medical management (I)	Ergonomic interventions to prevent or facilitate recovery (I)	
Greater Trochanteric Bursitis/Greater Trochanteric Pain Syndrome	Measures to prevent falls (I) Limitations may be helpful in the acute phase (I) Trochanteric glucocorticosteroid injections for acute, subacute, or chronic trochanteric bursitis or greater trochanteric pain syndrome (C) NSAIDs or acetaminophen for acute, subacute, or chronic trochanteric bursitis or greater trochanteric pain syndrome (I)	Ergonomic interventions to prevent or facilitate recovery (I) Topical NSAIDs (I) Lidocaine patches (I) Eutectic mixture of local anesthetics (EMLA) (I) Other creams/ointments (I)	
Groin Strains and Adductor-Related Groin Pain	Measures to prevent falls (I) NSAIDs (I) Work limitations for patients with groin strains or adductor-related groin pain who perform high-physical jobs or cannot avoid job tasks thought to have resulted in the strain (I) Ice (I) Heat (I) Ace wraps (I) Physical or occupational therapy (I)	Ergonomic interventions to prevent or facilitate recovery (I) Work limitations for most groin strains or adductor-related groin pain (I)	Bed rest (I)
Hamstring and	Measures to prevent falls (I)	Ergonomic interventions to prevent or facilitate	Bed rest (I)

Hip and Groin Disorder	Treatment with Evidence Rating/Recommendation Level		
Hip Flexor Strains	NSAIDs (I) Work limitations for patients with hamstring or hip flexor strains who perform high-physical jobs or cannot avoid job tasks thought to have resulted in the strain (I) Ice (I) Heat (I) Ace wraps (I) Physical or occupational therapy (I) Progressive agility, trunk stabilization and icing (PATS) (I)	recovery (I) Work limitations for most hamstring or hip flexor strains (I) No Recommendation	
	Recommended		Not Recommended
Hip Fracture	Measures to prevent falls (I) Bisphosphonates for select patients with osteopenia-related hip fractures (A) Calcitonin for patients with hip fracture, particularly those who are intolerant to or have other contraindications for bisphosphonates (I) Transcutaneous electrical nerve stimulation (TENS) for emergency transport of patients with hip fracture (B) Acupressure for transporting patients with hip fracture to the hospital (B) Surgical treatment (C) Surgical intervention as soon as the patient is medically stable (I) Arthroplasty for older patients with displaced femoral neck and subcapital fractures (A)	Ergonomic interventions to prevent or facilitate recovery (I) Manipulation or mobilization (I)	
Femoroacetabular Impingement, "Hip Impingement," and Labral Tears	Measures to prevent falls (I) NSAIDs (I) Local glucocorticosteroid injections (I) Physical or occupational therapy (I) Arthroscopic surgery or open repair for "hip impingement" or labral tear cases that fail conservative management (I)	Ergonomic interventions to prevent or facilitate recovery (I)	
Hip Osteoarthrosis	Measures to prevent falls (I) Aerobic exercise (B) Stretching exercises for select patients with significant reductions in range of motion that	Ergonomic interventions to prevent or facilitate recovery (I) Norepinephrine reuptake inhibiting anti-depressants (I)	Tumor necrosis factor-alpha blockers (I) Magnets and

Hip and Groin Disorder	are not thought to be fixed deficits (I) Treatment with Evidence Rating/Recommendation Level Strengthening exercises (B)	Topiramate (I) Gabapentin (I)	magnetic stimulation (I)
	Recommended	No Recommendation	Reflexology (I) Not Recommended
	A trial of aquatic therapy for patients with hip osteoarthrosis who meet the referral criteria for supervised exercise therapy and have co-morbidities (e.g., extreme obesity, significant degenerative joint disease, etc.) that preclude effective participation in a weight-bearing physical activity and who will either transition to a land-based program or a self-administered water-based program (I) NSAIDs for chronic hip pain especially if due to osteoarthrosis (A) Acupuncture for select use for chronic osteoarthrosis of the hip as an adjunct to more efficacious treatments (B) Cryotherapies for home use if efficacious for temporary relief of osteoarthrosis (I) Self-application of low-tech heat therapy (I) Intraarticular glucocorticosteroid injections (B) Intraarticular hip viscosupplementation injections (I) Hip arthroplasty for severe arthritides (A)	Glucosamine sulfate 1,500mg daily (single or divided dose), chondroitin sulfate, or methylsulfonylmethane for treatment hip osteoarthrosis (I) Glucosamine sulfate intramuscular injections (I) Glucosamine sulfate intraarticular injections (I) Glucosamine sulfate, chondroitin sulfate, or methylsulfonylmethane for prevention of osteoarthrosis (I) Diacerein (I) Diathermy (I) Infrared therapy (I) Ultrasound (I) Low-level laser therapy (I) Manipulation or mobilization (I) Massage (I) Electrical therapies outside of research settings (I) TENS (I) Botulinum injections (I)	
Lower Abdominal Strains	Measures to prevent falls (I) NSAIDs (I) Work limitations for patients with lower abdominal strains who perform high-physical jobs or cannot avoid job tasks thought to have resulted in the strain (I) Ice (I) Heat (I) Physical or occupational therapy (I)	Ergonomic interventions to prevent or facilitate recovery (I) Work limitations for most lower abdominal strains (I)	Bed rest (I)
Meralgia Paresthetica	Measures to prevent falls (I) Weight loss for patients who are overweight or obese, avoidance of aggravating exposures, and the wearing of loose clothing (I) Glucocorticosteroid injections for meralgia	Ergonomic interventions to prevent or facilitate recovery (I) NSAIDs (I) Topical lidocaine patches (I) Spinal cord stimulators for select patients (I)	

Hip and Groin Disorder	paresthetica if more conservative treatments are not efficacious (I) Treatment with Evidence Rating/Recommendation Level		
	Surgical release for select patients (I) Recommended	No Recommendation	Not Recommended

Table 3. Summary of Recommendations for Pre-, Peri-, and Post-operative Issues Related to Hip and Groin Disorders

Recommended	No Recommendation	Not Recommended
Gabapentin for peri-operative management of hip pain to reduce need for opioids, particularly in patients with adverse effects from opioids (A) NSAIDs for post-operative hip pain (I) NSAIDs for prevention of heterotopic bone formation after arthroplasty (B) Acetaminophen (or the analog, paracetamol) for post-operative hip pain particularly in patients who have contraindications for NSAIDs (I) Judicious use of opioids for post-operative hip pain (I) Cryotherapy for hip arthroplasty and surgery patients (C) Acupuncture for hip arthroplasty procedures (B) One-day use of systemic antibiotics for patients undergoing surgical hip procedures (B) Pre-operative education program prior to hip arthroplasty (B) Prevention of venous thromboembolic disease for post-operative hip patients, particularly arthroplasty patients or other post-operative patients with prolonged reductions in activity (early ambulation is recommended) (A) Use of post-operative graded compression stockings for prevention of venous thromboembolic disease (B) Use of lower extremity pump devices for prevention of venous thromboembolic disease (B) Low-molecular weight heparin for prevention of venous thromboembolic disease (A) Factor Xa inhibitors for prevention of venous thromboembolic disease (A) Warfarin and heparin for prevention of venous thromboembolic disease (B) Aspirin for prevention of venous thromboembolic disease (B) A pre-operative exercise program particularly emphasizing cardiovascular fitness and strengthening especially for patients who exhibit evidence of weakness or unsteady gait. Flexibility components may be reasonable in those without fixed deficits. (B) Post-operative exercise program and rehabilitation program for hip arthroplasty surgery patients (B) For at least the first 6 weeks post-operatively, use walking aid as long needed (C) For at least the first 6 weeks post-operatively, add other recommendations	Manipulation or mobilization for surgical patients (I) Pre-operative autologous blood donation (I) Routine peri-operative use of bisphosphonates (I) Routine post-operative use of calcitonin (I) Use of treatment in a geriatric unit or using interdisciplinary rehabilitation (I) Use of a late post-operative program for patients with mild reductions of questionable significance in the late post-operative period (I) Specific vocational or avocational pursuits post-operatively (I)	Tumor necrosis factor-alpha blockers for arthroplasty patients with peri-acetabular osteolysis (I)

Recommended	No Recommendation	Not Recommended
only if needed (e.g., elevated toilet seats, prohibiting driving) (C) For at least the first 6 weeks post-operatively, activity of daily living (ADL) adaptive equipment as needed (e.g., long-handled reacher, long-handled shoe horn or sock aid) (I) Post-operative exercise program and rehabilitation program for hip fracture patients (B) Geriatric unit treatment for patients with multiple health care issues, particularly if there is moderate dementia (C) A late post-operative exercise program after either arthroplasty or hip fracture emphasizing cardiovascular fitness and strengthening or resistance for patients who exhibit significant evidence of weakness or unsteady gait. A home exercise program among motivated patients may be sufficient. (C)		

Definitions:

Strength of Evidence Ratings

A = Strong evidence-base: Two or more high-quality studies.*

B = Moderate evidence-base: At least one high-quality study or multiple moderate-quality studies** relevant to the topic and the working population.

C = Limited evidence-base: At least one study of moderate quality.

I = Insufficient evidence: Evidence is insufficient or irreconcilable.

*For therapy and prevention, randomized controlled trials (RCTs) or crossover trials with narrow confidence intervals and minimal heterogeneity. For diagnosis and screening, cross sectional studies using independent gold standards. For prognosis, etiology or harms, prospective cohort studies with minimal heterogeneity.

**For therapy and prevention, well-conducted cohort studies. For prognosis, etiology or harms, well-conducted retrospective cohort studies or untreated control arms of RCTs.

Strength of Recommendations

Recommendation	Evidence Rating	Description of Category
Strongly Recommended	A	The intervention is strongly recommended for appropriate patients. The intervention improves important health and functional outcomes based on high quality evidence, and the Evidence-Based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs.
Moderately Recommended	B	The intervention is recommended for appropriate patients. The intervention improves important health and functional outcomes based on intermediate quality evidence that benefits substantially outweigh harms and costs.
Recommended	C	The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits.
Insufficient - Recommended (Consensus-based)	I	The intervention is recommended for appropriate patients and has nominal costs and essentially no potential for harm. The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, or collective experience that patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation.

Recommendation	Evidence Rating	Description of Category
Insufficient - No Recommendation (Consensus-based)	I	The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined.
Insufficient - Not Recommended (Consensus-based)	I	The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs or high potential for harm to the patient.
Not Recommended	C	Recommendation against routinely providing the intervention. The EBPP found at least intermediate evidence that harms and costs exceed benefits based on limited evidence.
Moderately Not Recommended	B	Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least intermediate evidence that the intervention is ineffective, or that harms or costs outweigh benefits.
Strongly Not Recommended	A	Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is ineffective, or that harms or costs outweigh benefits.

Clinical Algorithm(s)

The following clinical algorithms are provided in the original guideline document:

- Master Hip and Groin Algorithm: ACOEM Guidelines for Care of Acute and Subacute Hip Disorders
- Initial Evaluation of Hip and Groin Disorders
- Initial and Follow-up Management of Hip and Groin Disorders
- Evaluation of Slow-to-Recover Patients with Hip and Groin Disorders (Symptoms >4 Weeks)
- Surgical Considerations for Patients with Anatomic Evidence of Torn Labrum or Ligament and Persistent Hip Symptoms
- Further Management of Hip and Groin Disorders
- Management of Labral Tears and Osteoarthrosis for Patients with Hip and Groin Symptoms
- Management of Hip Osteonecrosis

Scope

Disease/Condition(s)

Hip and groin disorders

Guideline Category

Diagnosis

Evaluation

Management

Rehabilitation

Treatment

Clinical Specialty

Family Practice

Internal Medicine

Orthopedic Surgery

Physical Medicine and Rehabilitation

Preventive Medicine

Surgery

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Health Care Providers

Occupational Therapists

Physical Therapists

Physician Assistants

Physicians

Utilization Management

Guideline Objective(s)

- To describe evidence-based best practices for key areas of occupational medical care and disability management
- To improve or restore the health of workers with occupationally related illnesses or injuries
- To improve the quality of occupational medical care and disability management

Target Population

Adults with potentially work-related hip and groin disorders seen in primary care settings

Interventions and Practices Considered

Diagnosis/Evaluation

1. Antibody levels measurement
2. Hip arthroscopy
3. Bone scans
4. Computerized tomography (CT)
5. C-reactive protein, erythrocyte sedimentation rate, and other nonspecific inflammatory marker levels
6. Local anesthetic injections and epidurals
7. Electromyography (including nerve conduction studies)
8. Magnetic resonance imaging (MRI)
9. MR arthrogram
10. Roentgenograms (X-rays)
11. Ultrasound

Management/Treatment

1. Measures to prevent falls
2. Activity modification/exercise
    - Work limitation/work conditioning

- Bed rest
- Exercise (aerobic, stretching, strengthening, aquatic therapy)

3. Medication
    - Non-steroidal anti-inflammatory drugs (NSAIDs)
    - Proton pump inhibitors, misoprostol, Sucralfate, histamine type 2 receptor blockers (as indicated)
    - Acetaminophen (paracetamol)
    - Aspirin
    - Opioids
    - Muscle relaxants
    - Capsicum
    - Bisphosphonates
    - Calcitonin
    - Age-appropriate antibiotics
    - Trochanteric glucocorticosteroid injections
4. Physical methods
    - Canes and crutches
    - Orthotics, shoe insoles, shoe lifts
    - Physical or occupational therapy
    - Progressive, eccentric exercise
    - Ice, heat, ace wraps
    - Progressive agility, trunk stabilization and icing (PATS)
    - Transcutaneous electrical nerve stimulation (TENS)
    - Acupressure
    - Acupuncture
    - Cryotherapies
    - Heat therapy
5. Aggressive targeting of all coronary artery disease risk factors
6. Surgery
    - Core decompression surgery
    - Hip arthroplasty/total hip arthroplasty
    - Metal-on-metal hip resurfacing arthroplasty
    - Simultaneous bilateral hip replacement
    - Surgical repair of muscle tears
7. Intra-articular hip viscosupplementation injections
8. Weight loss
9. Psychological evaluation
10. Cognitive behavioral therapy

Management of Pre-, Peri-, and Post-operative Issues

1. Gabapentin
2. NSAIDs
3. Acetaminophen
4. Opioids
5. Cryotherapy
6. Acupuncture
7. Systemic antibiotics
8. Pre-operative education program
9. Prevention of venous thromboembolic disease (early ambulation, post-operative graded compression stockings, lower extremity pump devices, low-molecular weight heparin, Factor Xa inhibitors, warfarin and heparin, aspirin)
10. Pre- and post-operative exercise program
11. Rehabilitation program

Major Outcomes Considered

- Time to return to work
- Symptom relief

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

The following databases were searched from 1966 to 2010:

- The National Library of Medicine's MEDLARS database (Medline) (www.nlm.nih.gov)
- EBM Online (www.bmjjournals.com)
- The Cochrane Central Register of Controlled Trials (http://www.thecochranelibrary.com/view/0/index.html)
- TRIP Database (www.tripdatabase.com)
- CINAHL (nursing, allied health, physical therapy, occupational therapy, social services: http://www.cinahl.com/wpages/login.htm)
- EMBASE (www.embase.com/)
- PEDro (www.pedro.fhs.usyd.edu.au/)

Ranking and Preliminary Screening of Studies

Primary sources selected for inclusion in the evidence base for American College of Occupational and Environmental Medicine (ACOEM) products and services are limited to those with the strongest apparent study design, pending quality rating. The strength and quality of study design are determined by ranking and rating of the studies according to accepted methods. Generally accepted ranking of study design for diagnostic testing and clinical treatment methods were modified by the Guideline Methodology Committee (GMC). Systematic reviews in general are not ranked as the best design in reality, as most reviews located during pilot testing of the Methodology, with the exception of many (but not all) Cochrane reviews, did not use systematic searches or quality assessments of included studies. The GMC also excluded level 4 evidence from consideration (case series, poor-quality cohort studies, poor-quality case-control studies, expert opinion without explicit critical appraisal, and expert opinion based on physiology, bench research, first principles). The focus was on the best-designed original studies, pending quality grading. For example, studies of diagnostic tests are generally limited to those compared to an acceptable gold standard, and those reporting sensitivity and specificity. Studies of clinical treatment methods are generally limited to randomized controlled trials or crossover trials. Additional literature was also reviewed when there was a paucity of higher-grade literature or if it was brought to Evidence-based Practice Panel's (EBPP's) attention from interested parties.

To narrow the data discovered in the search to that which will be acceptable for further analysis and quality rating, researchers use additional preliminary screening criteria for original research.

Criteria for Inclusion in Study Rating and Critical Analysis of Studies of Diagnosis/Clinical Assessment Methods

1. Evaluate the efficacy (i.e., clinical accuracy) of the assessment method (i.e., the "test") in a group that contains subjects both with and without the condition the test is intended to assess.
2. Be a prospective cohort study or an arm of an randomized controlled trial (RCT).
3. Compare the findings of the assessment method (test) to an adequate reference standard for all subjects (not just subjects who tested positive).

Criteria for Inclusion in Study Rating and Critical Analysis of Studies of Treatment Efficacy

1. Evaluate a group of subjects with a representative spectrum of the clinical condition of interest.
2. Be a randomized controlled trial evaluating clinical outcomes in a group receiving the intervention compared to a comparison group receiving either no intervention or a different intervention.
3. Evaluate functional outcomes that are important to a patient's overall health or well being or are important to society.

Searches are documented, listing the database searched, the search terms, article type and limits, the time frame searched (in this case, all years in the databases), the number of studies found, the number reviewed in detail, and the number included in the systematic analysis. Despite multiple database searches, many additional studies are discovered in exhaustive manual searches of article reference lists.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Strength of Evidence Ratings

A = Strong evidence-base: Two or more high-quality studies.*

B = Moderate evidence-base: At least one high-quality study or multiple moderate-quality studies** relevant to the topic and the working population.

C = Limited evidence-base: At least one study of moderate quality.

I = Insufficient evidence: Evidence is insufficient or irreconcilable.

*For therapy and prevention, randomized controlled trials (RCTs) or crossover trials with narrow confidence intervals and minimal heterogeneity. For diagnosis and screening, cross sectional studies using independent gold standards. For prognosis, etiology or harms, prospective cohort studies with minimal heterogeneity.

**For therapy and prevention, well-conducted cohort studies. For prognosis, etiology or harms, well-conducted retrospective cohort studies or untreated control arms of RCTs.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Study Assessment and Quality Rating

Studies are first abstracted into evidence tables for easier assessment. See Appendix B in the methodology companion (see the "Availability of Companion Documents" field) for a sample of an evidence table for treatment studies. Each study is formally graded for quality using a modification of the most recent assessment scheme proposed by the Cochrane Collaboration Back Group, as shown in the table below. The studies are quality rated using a 0, 0.5, 1 grade for each item, where 0 = does not fulfill the requirement; 0.5 = partially fulfills the requirement and 1 = entirely fulfills the requirement. A study with a score less than 4.0 is rated as a poor-quality study; a study with a score between 4.0 and 7.5 is rated as a moderate-quality study. A study with a score of 8.0 or greater is rated as a high-quality study.

Rating Criteria for Randomized Controlled Trials of Treatment Studies

Criterion	Description
Randomization	Assessment of the degree that randomization was both reported to have been performed and successfully achieved through analyses of comparisons of variables between the treatment and control groups

Criterion	Description
Treatment allocation concealed	Concealment of the allocation of patients to various arms of the study from all involved, including patients, clinicians, and researchers
Baseline comparability	Measures how comparable the baseline groups are (e.g., age, gender, prior treatment)
Patient blinded	The patient is not aware which group he or she is in
Provider blinded	The provider is not aware which treatment he or she is delivering
Assessor blinded	The researcher is not aware which group the results apply to
Co-interventions avoided	The degree to which the study design avoided multiple interventions at the same time
Compliance acceptable	Measures the degree of noncompliance with the treatment protocol
Dropout rate	Measures the dropout rate at different periods of time
Timing of assessments	Assessments and reassessments should be performed at the same time from inception for all study groups
Analyzed by intention to treat	Whether the study data was analyzed with an "intention to treat" analysis

Methods Used to Formulate the Recommendations

Expert Consensus

Expert Consensus (Nominal Group Technique)

Description of Methods Used to Formulate the Recommendations

Each recommendation includes citations of the specific scientific literature which supports the recommendation. The recommendations explicitly consider the health benefits, side effects, and risks of the proposed recommendation. Recommendations include the data elements described below.

Content of Recommendations for Diagnostic Testing or Treatment

1. The diagnoses for which the test or treatment is indicated
2. The specific indications for the test or treatment
3. The point in the time course of the problem for which it is appropriate
4. Prior conservative treatment that should be tried first
5. Relative and absolute contraindications to the test or procedure
6. The number of tests or procedures that are appropriate at a given time in the course of the problem
7. The potential benefits of the test or procedure
8. The potential harms, including effects on disability and return to work

The Evidence-based Practice Panels (EBPPs) for each topic area review and discuss draft practice recommendations from the research staff that includes a review of the quality evidence, evidence tables, and summaries. The strength of evidence rating is confirmed by the EBPP responsible for the topic, with review by the Guideline Methodology Committee (GMC). EBPP members may present additional comments related to their clinical opinions and experience for panel consideration. If a unanimous decision is not possible, an EBPP may vote on the rating of the strength of the evidence to determine a consensus. Dissenters to the consensus may draft minority opinions about the strength of evidence. In practice, this has not happened as recommendations have been unanimous.

Formulation of recommendations requires clinical judgment as well as a full evaluation and consideration of the available high-quality evidence. To

aid in framing recommendations, the GMC developed a list of "First Principles" based on the Hippocratic Oath ("First Do No Harm"), medical logic, appropriate sequencing and case management, shared decision-making, support of functional recovery, and relative cost-effectiveness. The First Principles are defined in Table 7 in the methodology companion (see the "Availability of Companion Documents" field). When there is insufficient high-quality evidence of effectiveness or efficacy, or the high-quality evidence is conflicting, and to guide recommendations for alternative tests or treatments when there are several options, these principles are used to guide group decision-making.

The EBPPs then assign a Strength of Recommendation to each recommendation. If a consensus cannot be reached on the recommendation or strength of recommendation, the EBPPs may use nominal group voting if agreement is not possible in the discussion. Once a consensus is reached, the EBPPs will finalize the language and strength rating of the recommendation. If needed and material, a minority opinion can be appended to the recommendation.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

Recommendation	Evidence Rating	Description of Category
Strongly Recommended	A	The intervention is strongly recommended for appropriate patients. The intervention improves important health and functional outcomes based on high quality evidence, and the Evidence-Based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs.
Moderately Recommended	B	The intervention is recommended for appropriate patients. The intervention improves important health and functional outcomes based on intermediate quality evidence that benefits substantially outweigh harms and costs.
Recommended	C	The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits.
Insufficient - Recommended (Consensus-based)	I	The intervention is recommended for appropriate patients and has nominal costs and essentially no potential for harm. The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, or collective experience that patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation.
Insufficient - No Recommendation (Consensus-based)	I	The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined.
Insufficient - Not Recommended (Consensus-based)	I	The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs or high potential for harm to the patient.
Not Recommended	C	Recommendation against routinely providing the intervention. The EBPP found at least intermediate evidence that harms and costs exceed benefits based on limited evidence.
Moderately Not Recommended	B	Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least intermediate evidence that the intervention is ineffective, or that harms or costs outweigh benefits.
Strongly Not Recommended	A	Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is ineffective, or that harms or costs outweigh benefits.

Cost Analysis

The guideline developers reviewed published cost analyses.

Method of Guideline Validation

Clinical Validation-Pilot Testing

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Internal Quality Review

The Guideline Methodology Committee (GMC) assigns a committee member to each Evidence Based Practice Panel (EBPP) as a methodology consultant to assist with adherence to this methodology. The GMC reviews all recommendations for which there are questions about consistency with the defined methodology. If the GMC determines that the approved methodology has not been followed, leading to illogical or untenable recommendations, the GMC engages in direct discussions with the EBPP to reach agreement on revision. If there is no agreement or revision, then the matter will be considered by the American College of Occupational and Environmental Medicine (ACOEM) Board of Directors when the document is submitted for Board review.

External Review

ACOEM conducts external peer review of the ACOEM Occupational Medicine Practice Guidelines (APGs) and periodic revisions to 1) assure that all relevant high-quality scientific literature has been found, 2) assure that the important evidence from the relevant scientific literature relevant has been accurately interpreted, 3) solicit opinions on whether the findings and recommendation statements are appropriate and consistent with the evidence, and 4) obtain general information on the conclusions and presentation of materials from external topic experts. Professional and patient organizations, as well as panel members, ACOEM Board of Directors, etc., are invited to nominate external peer reviewers.

Peer reviewers are asked to comment on the completeness of the scientific literature evaluation in their topic area, the clarity and technical accuracy of the APGs evaluation and summary of the evidence, and the appropriateness of the Guideline findings and recommendation statements.

Stakeholder Input

In a cyclical manner, ACOEM will seek stakeholder input to understand the needs and preferences of those who may utilize or be affected by the use of clinical practice guidelines in workplace settings and in the workers' compensation system. ACOEM solicits input from clinicians, health care systems, workers or patients, employers, utilization reviewers, case managers, insurers and third party administrators, attorneys, regulators, and policy makers through a variety of mechanisms. Stakeholders will be asked for comments about their experience using existing clinical practice guidelines and related products and their suggestions for future improvements. They are also asked for input on the use of clinical practice guidelines in clinical care, case management, claim administration, claim adjudication, and in the development of policies and regulations.

To ensure editorial independence in the development process, the stakeholder groups will be asked for input about the APGs, but will not be informed of panel deliberations or shown drafts of practice recommendations before the formal release of the documents. In some cases, a member of a stakeholder group may participate as a member of a Guideline EBPP or may participate in peer review or pilot testing. However, all individuals involved in the APGs development, peer review, and pilot testing are asked to keep all information about the panel's deliberations and conclusions confidential until the APGs are formally released.

Pilot Testing

The guidelines are pilot tested to determine if the recommendations are clear, easy to use, and are generally useful. Pilot testers are not asked if they think the recommendations or process for development was appropriate.

Review by the GMC and the ACOEM Board of Directors

During the entire evidence-based product development process, the GMC will work with the Panels, editors, and research staff to ensure that the evidence-based product methodology is being followed, both in the literature evaluation process and development of conclusion and recommendation statements. The Board of Directors has an opportunity to comment on the Guidelines during the external review period. Their comments are reviewed by the Panel and any necessary changes are made to the Guidelines.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Improved efficiency of the diagnostic process including identification of red flags
- Effective treatment resulting in symptom alleviation and cure

Potential Harms

- False-positive or false-negative diagnostic tests
- Risks and complications of surgical procedures and imaging studies (e.g., infection, radiation). Dislocations are among the most common post-operative complications.
- Gastrointestinal bleeding is associated with non-steroidal anti-inflammatory drugs (NSAIDs).
- Adverse effects of bisphosphonates include gastritis, reflux esophagitis (can be severe and erosive causing stricture and achalasia), and osteonecrosis of the jaw (uncommon).
- Adverse effects of calcitonin are relatively rare and include nausea, vomiting, decreased appetite, abdominal pain, injection site reactions, nasal symptoms, rhinitis, sinusitis, anaphylaxis, bronchospasm, hypersensitivity reactions, osteogenic sarcoma, and hypocalcemic tetany.
- Adverse effects with opioids appear prominent, especially during introduction and/or dose adjustment. These include effects on the central nervous system (CNS) (drowsiness, somnolence, fatigue, tolerance) and the gastrointestinal (GI) tract (constipation, nausea, dyspepsia), although there are other CNS and GI effects, as well as effects on the cardiovascular, respiratory, dermatologic, endocrine, and musculoskeletal systems. Tolerance, addiction, and drug-seeking behaviors are common. Approximately 80% of patients experience some adverse effects from opioids and approximately 33% to 66% do not finish a clinical trial with opioids due primarily to these adverse effects (the large range in estimates is due to trial design such as whether a wash-out phase was included, length of treatment, and severity of pain).
- Generally, major bleeding is the most significant adverse effect of most of the medications used to prevent venous thromboembolic disease (VTED).
- The adverse effect profile of skeletal muscle relaxants is concerning, with CNS sedation rates ranging from approximately 25% to 50% and a low but definite risk of abuse. Thus, prescriptions for skeletal muscle relaxants for daytime use should be carefully weighed against the need to drive vehicles, operate machinery, or otherwise engage in occupations where mistakes in judgment may have serious consequences (e.g., crane operators, air traffic controllers, construction workers, etc.).
- Complications of hip arthroplasty include bone cement implantation syndrome (BCIS), fat emboli, intraoperative fractures, infected prostheses, dislocations and prothesis failure.

Contraindications

Contraindications

- Aggressive stretching may be contraindicated if symptoms are aggravated.
- Magnetic resonance imaging (MRI) is contraindicated with implanted metallic-ferrous devices.

Qualifying Statements

Qualifying Statements

The American College of Occupational and Environmental Medicine (ACOEM) provides this segment of guidelines for practitioners and notes that decisions to adopt particular courses of actions must be made by trained practitioners on the basis of the available resources and the particular circumstances presented by the individual patient. Accordingly, the ACOEM disclaims responsibility for any injury or damage resulting from actions taken by practitioners after considering these guidelines.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

Mobile Device Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Hip and groin disorders. In: Hegmann KT, editor(s). Occupational medicine practice guidelines. Evaluation and management of common health problems and functional recovery in workers. 3rd ed. Elk Grove Village (IL): American College of Occupational and Environmental Medicine; 2011. p. 1-440. [1499 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2011

Guideline Developer(s)

American College of Occupational and Environmental Medicine - Medical Specialty Society

Source(s) of Funding

American College of Occupational and Environmental Medicine

Guideline Committee

Evidence-based Practice Hip Panel

Composition of Group That Authored the Guideline

Panel Members: Judith Green McKenzie, MD, MPH, FACOEM (*Co-chair*); Joshua J. Jacobs, MD (*Co-chair*); Garson M. Caruso, MD, MPH, CIME, FAADEP, FACOEM; Edward B. Holmes, MD, MPH; Allison L. Jones, MD, MS; Laura Rachel Kaufman, MD, PhD; Cameron W. MacDonald, PT, DPT, GCS, OCS, FAAOMPT; Joseph C. McCarthy, MD; Brian J. McGrory, MD, MS; Marc Safran, MD; Jamie Stark, MS, PhD; Eric M. Wood, MD, MPH

Financial Disclosures/Conflicts of Interest

Garson M. Caruso, MD, MPH, CIME, FAADEP, FACOEM

Medical Director, Lakeview Occupational and Industrial Clinic, PA; Clinical Associate, Occupational and Environmental Medicine, Department of Medicine, John Hopkins Medical Institutions

National, Regional, Local Committee Affiliations—Peer Reviewer, *Journal of Occupational and Environmental Medicine*; Reviewer, International Archives of Occupational and Environmental Health; Member, Mental Health Committee, American College of Occupational and Environmental Medicine (ACOEM); Member, Health and Productivity and Work Fitness and Disability Sections, ACOEM

Guidelines Related Professional Activities—Co-Chair, Depression in the Workplace Project, ACOEM; Revision Committee, Health and Productivity Toolkit (2nd Ed.), ACOEM; Medical Expert Panels on Psychiatric Illness and Multiple Sclerosis and Parkinson's Disease, FMCSA

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—Perform Independent Medical Examinations (IMEs) for insurers and disability case reviews and peer review for several national companies.

Edward B. Holmes, MD, MPH

Chief Medical Consultant, Utah Disability Determination Services for Social Security; Owner, Holmes Company Consulting, Occupational Medicine and Medical Toxicology

National, Regional, Local Committee Affiliations—Medical Panel Chairman, Utah Labor Commission, Division of Adjudication; Member, Veteran's Affairs Compensation and Pension Disability Clinical Advisory Board (CPEP)

Guidelines Related Professional Activities—Member, Utah State Labor Commission Advisory Committees on Spine, Upper Extremity and Lower Extremity Impairment Guidelines; Member, Utah State Labor Commission Advisory Committee on Hearing and Vision Impairments; Member, Utah State Labor Commission Advisory Committee on Restorative Services (PT, Chiropractic, etc.); Member, Utah State Labor Commission Advisory Council

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—Consultations: causation, toxicology, work-relatedness of injury and disease, and social security disability

Joshua J. Jacobs, MD

William A. Hark, MD/Susanne G. Swift Professor and Chairman, Department of Orthopaedic Surgery, Rush Medical College; Director, Section of Biomaterials, Department of Orthopaedic Surgery, Rush Medical College; Senior Attending, Orthopaedic Surgery, Rush University Medical Center; Adjunct Professor, Department of Materials Science and Engineering, McCormick Technological Institute, Northwestern University

National, Regional, Local Committee Affiliations—Member, Editorial Advisory Board, American Academy of Orthopaedic Surgeons/American Association of Orthopaedic Surgeons Bulletin; Rush Medical College: Member of Residency Selection Committee in Department of Orthopedics and Residency Steering Committee in Department of Orthopedic Surgery; Chair of Scientific Leadership Council, Member of Research Council and Surgical Services Executive Committee; Chair of Management Oversight Team for Burden of Musculoskeletal Disease in the United States

Research Grants/Other Support—NIH/NIAMS: (1) Systemic implications of total joint replacement, (2) Biotribological Layers in Metal-on-Metal Hip Replacement; Spinal Motion: Determination of cobalt-chromium levels in serum

Financial/Non-Financial Conflict of Interest—Consultant: Zimmer, Inc., Medtronic, Johnson and Johnson, Implant Protection; Research Support: Zimmer, Wright Medical, Medtronic, Spinal Motion, Advanced Spine Technologies; Stock Options: Implant Protection

Allison L. Jones, MD, MS

Carle Clinic

National, Regional, Local Committee Affiliations—Member, Illinois Channel, Advisory Committee on Medicine, Science & Technology; Member, AMA "Action Team" to stop youth alcohol and other drug use

Guidelines Related Professional Activities—None

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

Laura Rachel Kaufman, MD, PhD

Family Medicine Physician, Urgent Care and Occupational Medicine Physician and Consultant, Group Health Permanente/Group Health Cooperative

National, Regional, Local Committee Affiliations—None

Guidelines Related Professional Activities—Past Member, Best Practices Workshop: Combined Effects of Chemicals and Noise on Hearing, NHCA and CDC/NIOSH

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

Cameron W. MacDonald, PT, DPT, GCS, OCS, FAAOMPT

Physical Therapist, Colorado Sport & Spine Center; Owner, Beinn Sonas Physical Therapy Services; Affiliate Faculty, Doctor of PT, Regis University Denver; Instructor, Post-Doctoral Fellowship in Orthopedic Manual Physical Therapy, Regis University Denver; Representative, American Physical Therapy Association

National, Regional, Local Committee Affiliations—None

Guidelines Related Professional Activities—American Academy of Orthopedic Manual Therapy Panel for Description of Advance Practice in Manual Physical Therapy

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

Joseph C. McCarthy, MD

Vice Chairman Department of Orthopedic Surgery Massachusetts General Hospital; active staff at Newton-Wellesley Hospital, New England Baptist Hospital, and Massachusetts General Hospital; Clinical Professor, Orthopedic Surgery, Tufts University School of Medicine; Director, Kaplan Joint Center for Reconstructive Surgery, Newton Wellesley Hospital in collaboration with Massachusetts General Hospital

National, Regional, Local Committee Affiliations—Board of Directors, Education and Research Foundation; Chair, Shands Circle, Education and Research Foundation; PAC Executive Committee, AAOS; Committee Appointment Program Committee, AAOS; Board of Specialty Societies Council on Education, AAOS; Evaluation of Orthopedic Work Force Needs, AAOS; Hurricane Katrina Taskforce, AAOS; Patient and Public Orthopedic Information Chair, AAOS; CME Educational Effectiveness, AAOS; Technology Assessment Council, AAOS; Council of Musculo-skeletal Specialists, AAOS; Board of Directors, AAOS; Nominating Committee, ABJS; Awards Committee, ABJS; Education Committee, The Hip Society; Editorial activities for *Seminars in Arthroplasty*, *Journal of Bone and Joint Surgery*, *Clinical Orthopaedics and Related Research*, *Journal of the American Academy of Orthopaedic Surgeons*, *Journal of Arthroplasty*, *Arthroscopy*

Guidelines Related Professional Activities—None

Research Grants/Other Support—Co-investigator, Harris Joint Registry at MGH; Co-investigator, Evaluation of the Wear of Vitamin E Polyethylene Components of Primary THA Using Radiostereometric Analysis

Financial/Non-Financial Conflict of Interest—Consultant/Royalties with Stryker Orthopedics, Innomed, and Arthrex.

Brian J. McGrory, MD, MS

Orthopaedic Associates of Portland, P.A.; Co-Director, Maine Joint Replacement Institute; Clinical Associate Professor, University of Vermont College of Medicine; Medical Director, Maine Medical Center Joint Replacement Center, Attending Surgeon, Maine Medical Center; Attending Surgeon, Mercy Hospital; Attending Physician, New England Rehabilitation Hospital; Consulting Physician, Stephens Memorial Hospital, Sunday River Mountain Clinic; Student Advisor, Tufts Medical School

National, Regional, Local Committee Affiliations—Program Chair, AAHKS (2010); Education Committee, AAHKS; Consultant/Reviewer, Clinical Orthopaedics and Related Research; Editorial Board, *Hospital Physician Board Review Manuals*; Editorial Board, *Hospital Physician*; Consultant/Reviewer, JAAOS

Guidelines Related Professional Activities— Taskforce Chair, AAOS Technology Overview: Modern Metal-on-Metal Resurfacing Arthroplasty (2009); Chair, AAHKS Evidence-based Medicine Committee

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

Judith Green McKenzie, MD, MPH, FACOEM

Associate Professor, Emergency Medicine, Hospital of the University of Pennsylvania

National, Regional, Local Committee Affiliations—Member, Health and Policy Committee, New Jersey Chapter, American College of Physicians; Reviewer, *Annals of Internal Medicine*; Reviewer, *American Journal of Managed Care*; Reviewer, *Journal of Occupational and Environmental Medicine*; Reviewer, *Journal of the National Medical Association*; Reviewer, *American Journal of Infection Control*; National Environmental Health Tracking Program – Network Implementation Technical Advisory Group, Pennsylvania Department of Health; Member, Committee of Medical Experts to Assist Social Security on Disability Issues

Guidelines Related Professional Activities—Member, Ad Hoc Study Section for NIOSH: Surveillance Special Emphasis Meeting, Council ZOHI SBO 50 R; Permanent Study Section Member, NIOSH

Research Grants/Other Support—The Johns Hopkins NIOSH Education and Research Center: Principal Investigator, Outcomes of a consultation program for emergency physicians for the evaluation and treatment of occupational bloodborne pathogen exposures; Center of Excellence in Environmental Toxicology: Co-Investigator, Pilot study of the feasibility and validity of FDG-PET/CT to quantitatively assess differential metabolic and inflammatory changes in organs of the whole body in relation to tobacco use; NIOSH: Co-Investigator, Training occupational medicine physicians

Financial/Non-Financial Conflict of Interest—None

Marc Safran, MD

Associate Chief, Sports Medicine, Stanford University; Fellowship Director, Sports Medicine, Stanford University; Professor of Orthopaedic Surgery, Stanford University; Consultant, NBA Players Association

National, Regional, Local Committee Affiliations—Member, Editorial Board, *American Journal of Sports Medicine*

Guidelines Related Professional Activities—None reported

Research Grants/Other Support—None reported

Financial/Non-Financial Conflict of Interest—None reported

Jamie Stark, MS, PhD

National Director of Outcomes, Select Medical Corporation

National, Regional, Local Committee Affiliations—Member, Assessment Instrument Workgroup, Centers for Medicare and Medicaid Services (CMS); Member, Short Term Alternatives for Therapy Services (STATS) Project, CMS; Technical Expert Panel Member, Developing Outpatient Therapy Payment Alternatives (DOTPA) Project, CMS; Reviewer, *Cardiovascular Research Journal*; Reviewer, *Journal of Pharmacology and Experimental Therapeutics*

Guidelines Related Professional Activities— Outpatient therapy utilization guidelines for internal benchmarking and externally with Select Provider Networks business unit

Research Grants/Other Support—None

Eric M. Wood, MD, MPH

Occupational Medicine Program Director and Residency Program Director in Occupational and Environmental Medicine, Rocky Mountain Center for Occupational and Environmental Health, University of Utah; Assistant Professor, School of Medicine, University of Utah; Staff Physician, InstaCare, Intermountain Health Care, Logan Regional Hospital

National, Regional, Local Committee Affiliations—Co-Chair, NIOSH, National Occupational Research Agenda, TWU Sector; Member, American Board of Preventive Medicine Occupational Medicine Examination Committee; Member, Education Committee, Department of Family and Preventive Medicine, University of Utah; Residency Advisory Committee, Rocky Mountain Center for Occupational and Environmental Health, University of Utah

Guidelines Related Professional Activities—Hospital committee guideline for clinical practice; occupational medicine outpatient clinic guidelines

Research Grants/Other Support—NIOSH (CDC) training grants and research grants primarily on the epidemiology of musculoskeletal disorders (e.g., CTS, shoulder tendinosis, LBP) and preventing work injuries and chronic illnesses in truck drivers.

Financial/Non-Financial Conflict of Interest—Honoraria: Teaching honoraria from various courses, mostly ACOEM-related; Clinical: Primary, secondary and tertiary clinical management of occupational injuries and diseases

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: To order a subscription to APG-I, the online version of the Guidelines, call 847-818-1800 or visit http://www.acoem.org/apg-i.aspx.

Print copies are available from the American College of Occupational and Environmental Medicine (ACOEM), 25 Northwest Point Boulevard, Suite 700, Elk Grove Village, IL 60007 by calling 847-818-1800 or order online at http://www.acoem.org/PracticeGuidelines.aspx.

Subscriptions to ACOEM's Practice Guidelines App are available for iPhone/iPod and iPad interfaces from the iTunes Web site

.

Availability of Companion Documents

The following is available:

- Methodology for the update of the occupational medicine practice guidelines, 2nd edition. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2008. Available from the ACOEM Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on November 7, 2012. The information was verified by the guideline developer on November 28, 2012. This summary was updated by ECRI Institute on October 28, 2013 following the U.S. Food and Drug Administration advisory on Acetaminophen. This summary was updated by ECRI Institute on March 10, 2014 following the U.S. Food and Drug Administration advisory on Low Molecular Weight Heparins. This summary was updated by ECRI Institute on September 18, 2015 following the U.S. Food and Drug Administration advisory on non-aspirin nonsteroidal anti-inflammatory drugs (NSAIDs). This summary was updated by ECRI Institute on June 2, 2016 following the U.S. Food and Drug Administration advisory on Opioid pain medicines.

Copyright Statement

Disclaimer

NGC Disclaimer

The National Guideline Clearinghouseâ„¢ (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria which may be found at http://www.guideline.gov/about/inclusion-criteria.aspx.

NGC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or clinical efficacy or effectiveness of the clinical practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI Institute, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.